DOCUMENT RESUME

ED 377 697 FL 022 661

AUTHOR Liu, Ngar-Fun
TITLE A Brief Critique of Chomsky's Challenge to Classical Phonemic Phonology.
PUB DATE Sep 94
NOTE 6p.; For complete volume, see FL 022 657.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Journal Articles (080)
JOURNAL CIT Hong Kong Papers in Linguistics and Language Teaching; n17 p39-43 Sep 1994

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Comparative Analysis; Foreign Countries; *Generative Phonology; Language Research; *Linguistic Theory; *Phonemics; *Phonology
IDENTIFIERS *Chomsky (Noam)

ABSTRACT

Phonemic phonology became important because it provided a descriptive account of dialects and languages that had never been transcribed before, and it derives its greatest strength from its practical orientation, which has proved beneficial to language teaching and learning. Noam Chomsky's criticisms of it are largely unjust because he has not examined the concept of the phoneme in its own theoretical framework but in the framework of generative phonology. Chomsky's generative phonology should therefore be regarded as an alternative account of sound structure rather than a valid critique of phonemic phonology. (MSE)

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A Brief Critique of Chomsky's Challenge to Classical Phonemic Phonology

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Liu Ngar-Fun
ELTU, The Chinese University of Hong Kong

ED 377 697

Abstract

This article argues for the different purposes for which phonemic analysis and generative phonology were developed: the former a practical tool for describing the relationship between the sounds of a language and its meaning, the latter a theoretical construct to explain how the sound system of a language operates. It will start with a brief look at the background to generative phonology. Chomsky's arguments against phonemic phonology will then be examined and his criticisms will be evaluated in light of the theoretical underpinnings of both the segment-based and generative approaches, and it will be concluded that classical phonemics has been unjustly criticised.

Introduction

The study of phonology is language-specific and it is concerned with syntagmatic and paradigmatic relations in a given language. In other words, it tries to establish systematic relations between distinct sound units which are linguistically significant. Phonetics can therefore be viewed as the physical aspect of phonology. The other aspect of it is psychological in the sense that we produce speech sounds which are physically continuous and yet we seem to PERCEIVE them as a sequence of discrete items (Wilkins, 1972; Anderson, 1985; Ohala, 1986). As Schane (1973, p.4) remarks, the discrepancy between the physical and continuous and the perceptual and discrete is what fuels the philosophical debate about appearance and reality. This critique is in part motivated by such a debate, and by the central question of the motivation for and subsequent application of a particular approach.

The Advent of Generative Phonology

The question of representations and the resulting quest for theories of them seem to be the dominant preoccupation of modern phonology (Anderson 1985, p.9). From the late 19th century up to the Chomskyan revolution, the phoneme as a unit of representations was regarded as a fundamental concept in phonology. With the advent of generative phonology spearheaded by Chomsky and Halle (1968), the phoneme was practically discarded for "a relatively abstract or morphophonemic underlying level of phonological representation from which the phonetic output could be derived by application of a set of phonological rules" (Clark and Yallop 1990, p.154). Chomsky (1964) asserts that description of the sound pattern of a language should not be based on "analytic procedures of segmentation and classification" (p.95) and therefore, criticises classical phonemics' concern with taxonomy, contrast, distribution and biuniqueness.

Chomsky's Characterisation of the Phoneme and its Constraints

Chomsky (1964) argues that the four constraints; namely, BIUNIQUENESS, LINEARITY, INVARIANCE and LOCAL DETERMINACY invoked by the phonemic approach

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render phonological representation impossible. Phonemes consist of allophones which do not contrast with one another. These allophones are realisations of the phonemes in actual speech. The phoneme /t/ has an aspirated version as its allophone but whether one says the word stop with the /t/ aspirated or not does not bring forth a change in meaning though the difference is what characterises native control of a language. In phonemic phonology, the use of these allophones are governed by rules about distribution which state, for example, that the allophone [tʰ] is to be realised when /t/ is initial and [t̚] when it is followed by a nasal consonant. As Jones (1950, p.11) puts it, every phone is to be assigned to some phoneme as an allophone of it and "it is to be taken as axiomatic that one sound cannot belong to two phonemes of a language."

Chomsky (1964, p.72) states this biuniqueness constraint as "each sequence of phones is represented by a unique sequence of phonemes" and vice versa. In other words, the biuniqueness condition requires an unambiguous mapping of phonemes and allophones to each other. This condition, generativists such as Chomsky contend, is rarely met since two phonemes may be distinguished in some environments but not in others. A case at hand is Chomsky's Russian example where [d'ad, bi] could either be manifested as /d'at, bi/ or /d'ad, bi/. Examples from English include the glottal stop [ʔ] which sometimes belongs to /t/ as in little and sometimes /o/ as in between how awful.

Chomsky (1964, p.78) maintains that the principle of complementary distribution, central to phonemic phonology, is "basically, the principle of biuniqueness converted into a procedure." This biuniqueness condition has to be abandoned with regard to neutralisation and the result is ambiguity in the analysis. For instance, [ə] could be an allophone of any other vowel and there may be no way of determining to which vowel phoneme it is to be assigned to. But Clark and Yallop (1990) points out that there is no indeterminacy if one makes use of related forms, i.e., grammatical or semantic relationships, in the analysis. Akamatsu (1990) appears to agree with Chomsky and cites many examples to show that assignment on grounds of phonetic similarity and complementary distribution forces unreal and arbitrary decisions. One of them is the English stops after [s] where there are as many phonetic properties supporting an assignment to /b/,/d/,/g/, as to /p/,/t/,/k/; and there is accordingly no definitive reason for one preference over the other.

The second constraint that Chomsky refers to is linearity, which seems rather similar to the biuniqueness constraint. It requires a one-to-one correspondence between the phonetic and phonemic representations so that one mirrors the other not only in terms of manifestation but also arrangement. His example of writer and rider in American English violates this condition since they differ phonemically only in their fourth segments but phonetically only in their second segments (Chomsky 1964, p.74). He also quotes an example of vowel nasalisation in English where, for instance, phonemic /kænt/ is phonetic [kæ̃t], though phonemic /hænd/ is phonetic [hæ̃nd] and argues that "no linguist would conclude that vowel nasalisation is distinctive in English, and can't - cat constitute a minimal pair, while can't - canned do not" (Chomsky 1964, p.73).

Even when linearity is preserved, Chomsky argues that another constraint -- the invariance condition -- would be untenable. It stipulates that each phoneme must have a set of features which occur together only in the allophones of that phoneme. Chomsky's example is the alveolar flap in butter and throw (American English) where it is the allophone of /t/ in the former and /r/ in the latter, and since overlapping is not allowed in the phonemic analysis, the flap must then be assigned to /t/ which thus leads to absurdities such as /təʊ/ for throw.

The final constraint, the local determinacy condition, gets very little treatment from Chomsky who asserts that it is "rather difficult to state precisely"; except that it is more than biuniqueness and that "the unique phoneme representation corresponding to a given phonetic form can be determined by purely phonetic considerations, or, perhaps, considerations involving only the phonetic environment" (1964, p.73).

Another major criticism levelled against classical phonemics is that the phoneme is not "an appropriate entity for representing morphemes" (Hutchinson 1972, p.24). In other words, it

does not embrace morphophonemics -- "the study of interchange between phonemes as a morphological process" (Anderson 1985, p.301); and therefore cannot account for the change, for example, from /k/ to /s/ in electric and electricity, or /i:/ to /e/ in obscene and obscenity. Chomsky thus argues for a morphophonemic level of analysis and in Chomsky and Halle (1968), the main focus is "the construction of a rule component in which morphologically related word forms could be derived from a set of morpheme-invariant underlying forms" (Basboll 1988, p.192). Chomsky's concern is in postulating a descriptively adequate grammar constrained by conditions on abstractness of underlying forms and on application of rules. In other words, phonemic phonology is rejected because it requires "separation of levels in the underlying theory" (Chomsky 1964, p.85) and the phonemic level is not abstract enough (Schane 1973, p.7).

How valid is Chomsky's challenge to phonemic phonology?

First, it is worth noting that Chomsky's characterisation of the notion of phoneme and the rules governing the relation between phonemic and phonetic representations and some of the inadequacies of these constraints may not be an accurate account of the structuralist position and tradition. Linell (1979), Hutchinson (1972) and others point out that the above version of phonemic analysis is a particularly rigid one which has limited acceptance even amongst phonologists of the structuralist persuasion.

More importantly, Chomsky's challenge is not conducted in classical phonemics' own proper theoretical framework. The underlying assumption of the phonemic approach is, as Anderson (1985, p.302) puts it, that focus should be on the representations of individual forms, since only the forms themselves are observable and thus "real". The theory, in essence, is a set of analytical procedures in which levels other than the phonological one play no part, i.e., the mixing of levels in phonemic analysis is prohibited. Moreover, statements of distribution or rule-governed relations only enter the picture in so far as they help identify and classify the phonemes, and making generalisations about these regularities is NOT the goal. Classical phonemics has, therefore, been unjustly attacked for its lack of theoretical apparatus for explaining natural classes and processes, for discovering universals, and for failing to achieve descriptive adequacy and to deal with morphophonemics, when none of these fall within its theoretical confines. Linell (1972, p.267) points out that Chomsky's argument for morphophonemic analysis "presupposes the existence of morpheme-invariant representations as an underlying phonological level" and, as such, is simply not tenable because the phonemic approach was not set up to study the morphological level of representation. In any case, McCawley (1986) asserts that a morphological level of analysis becomes suspect when put under close scrutiny.

Phonemic analysis is also said to be not abstract enough (Schane, 1973). The question that follows is: What is it not abstract enough for? Chomsky examines classical phonemics using the generativist approach. Whereas classical phonemics is concerned with taxonomy, generative phonology's goal is explanation. The latter has developed a theory of distinctive features which characterises natural classes. Rules about phonological processes are formulated in terms of these features rather than in terms of phonemes. In generative phonology, surface forms are the realisations of various underlying representations which are affected by rules. These underlying representations are necessarily abstract if they were to have the expressive power that Chomsky and Halle (1968) intended them to have. Needless to say, phonemic analysis is not abstract enough for formulating elegant mathematical-like rules which have the power of generalisation. But the point is that phonemic representations were not founded for generating simple, elegant and yet expressive phonological rules, or explaining the nature of language as such; but for the purpose of teaching spoken languages. In Jones' (1950, p.260) words, "the physical view of the phoneme is on the whole better suited to the needs of ordinary teaching of spoken languages" because it is "more easily comprehensible to the ordinary student of languages than any other." The motivation for the different approaches can best be summed up by Householder whose words are quoted in Anderson (1985, p.170), "The European asks: Is it true?, the American: Is it consistent?, the Englishman: Will it help?" Chomsky's critique of classical phonemics seems misguided because it has not been done with a proper understanding of the motivation for phonemic phonology.

The phoneme is certainly abstract enough if looked at from the point of view that it is concerned with the abstract set of meaning-distinguishing sounds in a language rather than the distinctions between the actual physical sounds we say and hear. In other words, it is abstract in the sense that it is based on what "every speaker of a language unconsciously knows about the sound patterns of that language" (Yule, 1985, p.45). In fact, with the advances in acoustic phonetics bringing in an increasing amount of physical evidence, the philosophical debate over the existence or non-existence of the phoneme in terms of its psychological reality has been given a new impetus. For example, recent psychoacoustic experiments reported in Beckman (1988) point to "a phonemic segmentation of speech". Furthermore, this segmentation "may well occur at an unconscious, perceptual level even in the pre-literate period" (Derwing et al. 1986, p.45).

Conclusion

Phonemic phonology became important because it provided a descriptive account of dialects and languages that had never been transcribed before (Clark & Yallop 1990, p.331) and it derives its greatest strength from its practical orientation which has proved to be beneficial to language teaching and learning. Chomsky's criticisms of it are largely unjust because he has not examined the concept of the phoneme in its own theoretical framework but in the framework of generative phonology. Anderson (1985, p.336) reaffirms the value of phonemic analysis and sums up aptly the position of the linguist as regards generative and phonemic phonology, "...surely both have their place in an adequate synthesis of our understanding of the nature of language. As it becomes more and more evident that language is a 'modular' system, representing the essential interaction of a number of domains, there is no reason to doubt that sound structure, too, must be approached from several independent perspectives simultaneously." Chomsky's generative phonology should therefore be regarded as an alternative account of sound structure rather than a valid critique of phonemic phonology.

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LIU Ngar-fun is an Instructor in the English Language Teaching Unit, The Chinese University of Hong Kong. Her main area of interest is second language pedagogy and acquisition, in particular speech processing in a second language.